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ABSTRACT

The study was designed to determine the effectiveness of an accelerated eighth-grade algebra program offered in the Bryan Independent School District since 1975. The major questions posed were: Have pupils been successful as eighth graders and in subsequent high school mathematics courses? (2) Have students been electing upper-level mathematics courses in high school? (3) Has the placement/screening process been effective? and (4) What is the attitude of pupils with regard to mathematics and to career choices utilizing mathematics? Results indicated the students chosen have been quite successful in eighth-grade algebra and in subsequent mathematics courses. Grades received and student perceptions indicate high levels of success. However, pupils were noted to not be electing upper-level mathematics courses at the rates expected. Three recommendations generated from the study were: (1) high school instructors and counselors should be encouraged to identify and advise the accelerated pupils to enroll in upper-level courses; (2) an identification matrix of earlier grades along with a standardized achievement test score would appear to be as good a predictor of success in acceleration as methods in use; and (3) the selected pupils, in particular, should receive frequent counseling on career choices and what such decisions mean with respect to mathematics studies. (MP)

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8th Grade Algebra After Six Years

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A Study Report
Prepared for

Bryan Independent School District

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Since the Fall of 1975, the Bryan Independent School District (BISD) has had an accelerated program in mathematics which permits selected students to study algebra in the 8th grade. As the result of a suggestion by the staff of BISD to study the effectiveness of the program, a research proposal was made by Dr. C. Dockweiler of the Department of Curriculum and Instruction of Texas A&M University. The proposal was subsequently accepted and the following is the report of that study.

The study was designed to determine the effectiveness of the 8th grade algebra program. In order to meaningfully formulate the study, several questions were posed:

Question 1: Have the students been successful as 8th graders and in subsequent high school mathematics courses?

Question 2: Have the students been electing upper level mathematics courses in high school?

Question 3: Has the placement/screening process been effective?

Question 4: What is the attitude of these students with regard to mathematics and to career choices utilizing mathematics?

The discussion that follows will attempt to give a measure of the general effectiveness of the program by answering these four questions.

A funding proposal was submitted to the Office of Research of the College of Education, Texas A&M University. The proposal for the funding of supplies and computer costs was funded and, therefore, cost to BISD was minimal.

Data Gathering

The gathering of information took place in two phases. First, the permanent record of each student in the study yielded BISD produced information and standardized test results.

1. BISD produced information

   a. Math grades for the elementary years
   b. Math grades for high school math courses completed

c. Teacher Evaluation Scores
d. Highest math level attained prior to 8th grade algebra
e. Total Identification Matrix score

2. Standardized test results

a. Iowa Algebra Aptitude Test
b. Intelligence Test
c. Mathematics Section of the California Test of Basic Skills
d. Scholastic Aptitude Test results (or PSAT)

Secondly, a survey instrument was developed (See Appendix A) to have the students provide self-reporting information on courses taken and attitudes with regard to the 8th grade algebra program. The instrument attempted to determine the student's reasons for taking algebra in the 8th grade; their perception of their success in high school math courses; their reasons for not taking math in high school if they did not continue; and their future plans concerning the study of mathematics.

Data Analysis and Discussion

The total number of students taking 8th grade algebra during the term of this study was 301, for whom most permanent file data was available. Table 1 lists the numbers by the year the group was enrolled in 8th grade algebra. The table also includes the number and percent of the sample which returned the survey. The percent of survey returns for the 1975 group is noticeably lower. This is possibly due to this group being out of high school for a year and the instruments were mailed to them, making the control of the returns much more difficult.

Table 1

Sample Size by Year

Year of 8th grade algebra	Total	Number returning survey	% returning survey
1975	42	22	52.4
1976	47	40	85.1
1977	31	27	87.1
1978	32	28	87.5
1979	54	45	83.3
1980	95	67	70.5
Totals	301	229	70.1

To determine the effectiveness of the program, each of the previously stated questions will be considered. Data analysis and discussion will be presented for each.

Question 1. Have the students been successful in algebra as 8th graders and in subsequent high school mathematic courses?

To obtain a measure of the success of students in 8th grade algebra, grades received were tabulated and averages were also obtained. The distribution of grades for each class of 8th grade algebra is shown in Table 2. For purposes of calculation, the grades were arbitrarily assigned values as follows: A-50, B-40, C-30, D-20, F-10.

From the grade standpoint, it appears that the students had a high degree of success. The table of grade averages per year (Table 3) supports that idea with all grades showing an average grade of higher than a B. Slight numerical discrepancies may be observed between averages calculated from Table 2 as compared to averages of Table 3. For purposes of reporting, the averages listed in Table 2 were rounded to the nearest whole number which would account for minor differences.

Table 2

8th Grade Algebra Grade Distribution

Year	n	50	40	30	20	10
1975	42	17	23	2	0	0
1976	47	18	20	7	2	0
1977	28	16	8	4	0	0
1978	32	21	8	3	0	0
1979	49*	18	25	5	0	1
1980	82*	35	25	20	1	1

*grades not available for 5 students in 1979 and 13 in 1980, which account for number discrepancy with previous table.

Table 3

8th Grade Algebra Grade Averages

Year	Average	% Making A or B
1975	43.29	94.3
1976	40.79	80.9
1977	43.82	85.7
1978	45.16	90.6
1979	41.2	87.8
1980	42.14	73.2
Overall	42.14	83.5

Additional evidence of success may be observed in the table of grade averages for subsequent courses (Table 4). All grade averages indicate a high degree of successful completion. Two years of Geometry (1976 and 1977) indicate fewer A's and B's as compared to other groups, but even those years resulted in two thirds of the students receiving A's and B's.

Table 4

Grade Averages for High School Math Courses

Year of Alg.I	Course	Geom.	Alg. II	Trig.	Elementary Analysis	Analytic Geom.	Calculus
1975	n	42	42	37	20	17	6
	Ave.	45.62	44.48	43.78	44.0	45.0	46.67
	% of A, B*	97.6	94.3	91.8	90.0	88.2	100
1976	n	46	46	44	17	22	6
	Ave.	41.43	45.61	43.18	42.94	47.27	43.3
	% of A, B	67.4	87.0	79.6	82.4	95.5	100
1977	n	30	27	23			
	Ave.	39.40	44.26	44.78			
	% of A, B	66.7	80.5	87.0			
1978	n	32	30				
	Ave.	47.34	45.07				
	% of A, B	96.9	90.0				
1979	n	44					
	Ave.	42.41					
	% of A, B	81.8					

* the percent of students earning A's or B's.

Further, there is support for the idea that successful students in Algebra I continue to be successful in subsequent courses, at least through Elementary Analysis. The correlations between Algebra I grades and the grades earned in other courses are highly significant through Trigonometry and significant, but to a lesser degree, through Elementary Analysis (Table 5). The reason for the lack of significance with Analytic Geometry and Calculus is not clear at this point of the discussion; however, the success of the upper level mathematic courses will be discussed later. It is true that the smaller number of students, particularly for Calculus, may influence the results.

Table 5

The Correlation of Algebra I Grades
With Other Courses

	n	Correlation Coefficient	p
Geom.	191	.64	.0001
Alg. II	144	.63	.0001
Trig.	102	.58	.0001
El. Analysis	37	.48	.0027
Analytic Geom.	40	.15	.3469
Calculus	9	.41	.2758

The previous discussion has only been concerned with the grades earned by the students. One section of the survey instrument (II A) required the students to indicate how successful they had been in courses completed (Very Successful, Successful, Barely Successful, Unsuccessful). The normal expectation is that students earning an A in a course would consider themselves to be very successful. The data does support this contention. When the grades earned were correlated with the student's perception of success a significant correlation was found (Table 6).

Table 6

The Correlation of Course Grades And
Student Perception of Success

	n	Correlation Coefficient	p
Alg. I	167	.56	.0001
Geom.	156	.62	.0001
Alg. II	114	.67	.0001
Trig.	77	.64	.0001
El. Analysis	25	.73	.0001
Analytic Geom.	31	.51	.0031

The question posed in this section regarding the success of students in Algebra I and subsequent courses can be answered affirmatively. Both grades earned and the student's perception of their success support the positive answer.

Question 2: Have the students been electing upper level mathematics courses in high school?

BISD officials indicate that a main purpose, if not the main purpose, of having an algebra program for 8th graders is to permit more capable students to complete a fifth year of high school mathematics. The answer to Question 2 deserves some importance in determining the effectiveness of the program.

Student enrollments in courses completed and the planned enrollments are reported in Table 7. The two years of complete data (1975 and 1976) shows a rather dramatic decrease after the completion of Trigonometry. The figures reflecting planned enrollment should be considered with the understanding that they are dependent upon the returned survey form from Table 1. Even with that qualification the decrease appears to be rather consistent after Trigonometry.

Analytic Geometry is the traditional and most logical course to follow Trigonometry. Therefore, further analysis was carried out to gain further information about attrition trends. Table 8 isolates the Algebra I and Analytic Geometry data of Table 7. The figures for 1977 were not included since the Analytic Geometry group was split between those that have completed (6) and those that plan to take (11).

For the two years (75 and 76) in which students have completed Analytic Geometry, the total percent retention is 42.9. For the last three years 40.5% of the students plan to take Analytic Geometry.

Table 7

Student Enrollment or Planned Enrollment in High School Mathematics Course by Year

Year In Alg. I	Alg. I**	Number of students enrolled or planning to enroll in Geom.	Alg. II	Trig.	El. Analysis	Analytic Geom.	Calculus
1975	42	42	42	37	20	17	6
1976	47	46	46	44	17	22	6
1977	31	30	29	23	18*	17*	15*
1978	32	32	30	22*	19*	17*	18*
1979	49	44*	44*	40*	19*	19*	15*
1980	82	65*	62*	59*	27*	30*	40*

*the number of students planning to take the courses.
**the number of students for which grades were available.

Table 8

Percent of Retention of Students from Algebra I to Analytic Geometry

Year of Alg. I	n of Alg. I	n of Analytic Geom.	% Retention
1975	42	17	40.5
1976	47	22	46.8
		Planning to take Analytic Geom.	
1978	32	17	53.1
1979	49	19	38.8
1980	82	30	36.6

Since a large number of students do not choose to take upper level mathematics, it may be enlightening to know something of their reported reasons. The Survey Instrument (Appendix A) included a section (II B) which elicited student reasons for not taking upper level mathematics courses. Five reasons were suggested and an "Other" category was included (Table 9). The students were encouraged to mark

as many as were appropriate. The percent figures reported is the percent of the total responding to this section (91 different individuals).

Table 9

Tabulation of Reasons for not Taking Upper Level Mathematics

Reason	n	% of Respondents
- math is too challenging	6	6.6
- math is too easy	3	3.3
- I took all the math required	48	52.7
- My future plans do not require mathematics	32	35.2
- advised to take other subjects	4	4.4
- other	30	33.0

Upon enrollment in 8th grade algebra these students agreed to take upper level mathematics courses. It is quite apparent that a considerable number of those not taking upper level courses (52.7%) were of the opinion that more math was not required. Additionally, a large group reported (35.2%) that advanced mathematics would not be necessary in their future plans.

It has already been observed that enrollment decreases before Elementary Analysis. Other evidence of inconsistencies also surface with respect to this course. As students progress from one level to the next and from one course to the next, a high degree of grade correlation would be expected. The correlation between adjacent grades is generally quite high (Table 10). The exception is between Elementary Analysis and Analytic Geometry. If the sequence omits Elementary Analysis and proceeds directly from Trigonometry to Analytic Geometry, the pattern of significant correlation continues.

Table 10

The Correlation of Grades Between
Adjacent Levels or Courses

Levels or Courses		Correlation		
From	To	Coefficient	p	n
1st	2nd	.48	.0001	183
2nd	3rd	.29	.0001	196
3rd	4th	.21	.0021	209
4th	5th	.34	.0001	223
5th	6th	.45	.0001	240
6th	7th	.38	.0001	250
7th	Alg.I	.33	.0001	257
Alg.I	Geom.	.64	.0001	191
Geom.	Alg.II	.59	.0001	145
Alg.II	Trig.	.67	.0001	103
Trig.	El.Anal.	.45	.0044	33
El.Anal.	Anal.Geom.	-.06	.8269	16
Trig.	Anal.Geom.	.34	.0325	40

Additionally, the grades awarded in courses from Algebra I to Trigonometry correlate significantly with the SAT Math component (Table 11). The correlation coefficient is not significant for Elementary Analysis (and Analytic Geometry also). It must be noted that the content of SAT Math does not go beyond the content of Trigonometry. It is interesting, however, to observe that an inconsistency occurs at Elementary Analysis in more than one way. There is the possiblity that something inherent to the course discourages student enrollment and also confuses the achievement of the students that do take it.

To conclude this section and to answer Question 2, it seems fairly evident that students are not electing mathematics courses to the extent that the District anticipated they would.

Table 11

The Correlation of High School Math Grades and SAT Math Scores

Course	Coefficient	p	n
Algebra I	.40	.0003	78
Geometry	.36	.0012	78
Algebra II	.51	.0001	78
Trigonometry	.46	.0001	73
El Anal.	.18	.2935	35
Anal. Geom.	.21	.1984	39

Question 3: Has the placement/screening process been effective?

The present placement/screening process uses a weighted identification matrix that incorporates six factors. They are; Instructional Level, Teacher Evaluation Score, Achievement Test (Arithmetic Composite), Iowa Algebra Aptitude Test Raw Score, Math Grade Averages (Grades 1-7), and Standardized Intelligence Quotient Test results.

Each of the individual factors and the Matrix Total was correlated with the students success in Algebra I as measured by their grade. These results are indicated in Table 12.

All of the matrix factors except Instructional Level and the Matrix Total have a significant correlation ($p < .05$) with the Algebra I grade. These results already suggest a different combination of factors may be appropriate.

To obtain further information about the factors which might be included in an adjusted matrix, linear regression was used to help determine the best factor combination to predict success in Algebra I. The initial equation used eleven predictor variables; all of the factors in Table 12, excluding Matrix Total and Instructional Level, with the Math Grades for each grade being used as separate variables (1st, 2nd, 3rd,..., 7th). Successive equations were produced by dropping the least

significant variable. This yielded the amount of variance accounted (R^2 converted to %) in each case (Table 13).

Table 12

The Correlation of Algebra I Grades with Matrix Factors

	Correlation Coefficient	p
Instructional Level (ILEV)	.00239	.9796
Teacher Evaluation Score (TEVS)	.31995	.018
Achievement Test (CTBS)	.32794	.0001
Iowa Algebra Aptitude (IWAL)	.2314	.0107
Math Grade Average	.47588	.0001
IQ Test (IQ)	.18160	.0034
Matrix Total	.10097	.2665

Table 13

Variance Accountability for Different Prediction Variables

Predictor Variables	R^2	n
1. IWAL, 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, TEVS, IQ, CTBS	.463022	83
2. IWAL, 1st, 3rd, 4th, 5th, 6th, 7th, TEVS, IQ, CTBS	.462468	83
3. 1st, 3rd, 4th, 5th, 6th, 7th, TEVS, CTBS	.459988	83
4. 3rd, 4th, 5th, 6th, 7th, TEVS, CTBS	.45799	83
5. 3rd, 4th, 5th, 6th, 7th, CTBS	.453785	83
6. 3rd, 4th, 5th, 7th, CTBS	.446734	83
7. 3rd, 5th, 7th, CTBS	.42581	83
8. 5th, 7th, CTBS	.40251	83
9. 5th, 7th	.33816	83

The amount of variance accounted for decreases very little as variables are removed from the model. From a maximum of 46.3% with all eleven predictors to 44.6% when only five predictors are used. This analysis suggests that TEVS, IQ and IWAL do not contribute to the models predictive success to warrant their inclusion. Some contribution of math grades and achievement test scores is probably adequate.

The grades awarded in Algebra I would certainly be an indicator of the success of the program. Table 14 reports year averages for grades in Algebra I (A: 50, B:40, C:30, D: 20, F:10).

Table 14

Grade Averages for Algebra I and % Receiving A or B

Year of Algebra I	1975	1976	1977	1978	1979	1980	Ave.
Grade Ave.	43.29	40.79	43.82	45.16	41.2	42.14	42.14
% Receiving A or B	94.3	80.9	85.7	90.6	87.8	73.2	83.5

The overall average indicates that 83.5% received an A or B; a good indicator of successful students. What of these students as they continue to take mathematics courses? Does this group continue to receive high grades in upper level mathematics (Table 15)? Previous discussion has pointed out the decrease in number of students enrolling in upper level courses, particularly Elementary Analysis, Analytic Geometry, and Calculus. This fact should be taken into consideration when grades are used for interpretation.

Although the grades and percent of A and B grades is quite high, the correlation between the student's grade in Algebra I and successive courses may imply something different (Table 16). Although the number of subjects dropped considerably and that may influence the correlation, the non-significant correlation with Analytic Geometry is interesting.

Table 15

Average Grades and Percent of A's and B's in Upper Level Math Courses

Year	Course	Geom.	Alg. II	Trig.	El. Anal.	An.Geom.	Calculus
1975	n	42	42	37	20	17	6
	Ave.	45.62	44.48	43.78	44.0	45.0	46.67
	% of A,B	97.6	94.3	91.8	90.0	88.2	100.0
1976	n	46	46	44	17	22	6
	Ave.	41.43	45.61	43.18	42.94	47.27	43.33
	% of A,B	67.4	87.0	79.6	82.4	95.5	100.0
1977	n	30	27	23			
	Ave.	39.40	44.26	44.78			
	% of A,B	66.7	80.5	87.0			
1978	n	32	30				
	Ave.	47.34	45.07				
	% of A,B	96.9	90.0				
1979	n	44					
	Ave.	42.41					
	% of A,B	81.8					

Although the grades and percent of A and B grades is quite high, the correlation between the student's grade in Algebra I and successive courses may imply something different (Table 16). Although the number of subjects dropped considerably and that may influence the correlation, the non-significant correlation with Analytic Geometry is interesting.

The previous discussion, in answering Question 3 have depended exclusively on grades received in Algebra I and successive courses as a measure of the effectiveness of the placement/screening process. The survey instrument (Appendix A) provides information of a different nature. Section II of A of the instrument asked the students to respond to a success grid. The students were first to indicate if a course had been taken and then they were to respond with their perception of how successful they were in the study of that content.

The correlation between course grade and student's perception of their success is quite high (Table 17) and significant ($p < .05$) for each course.

Table 16

Correlation of Grades in Algebra I and Successive Courses

Successive Courses	Correlation Coefficient	p	n
Geometry	.64418	.0001	191
Alg. II	.63479	.0001	144
Trig.	.57969	.0001	102
El. Anal.	.47837	.0027	37
An. Geom.	.15268	.3469	40
Calculus	.40787	.2758	9

Table 17

Correlation Between Course Grade and Student's Perception of Success

Course	r	p	n
Alg. I	.5628	.0001	167
Geom.	.62055	.0001	156
Alg. II	.66548	.0001	114
Trig.	.63831	.0001	77
El. Anal.	.73291	.0001	25
An. Geom.	.5141	.0031	31

On the survey instrument, Section I B, C, and D required responses which also gives some measure of the effectiveness of placement/screening process. With very few exceptions the students reported a willingness to take Algebra I (94.4%) if they could retrace their steps (Table 18). An even higher percent (97.6%) would recommend others to take Algebra as an 8th grader. Although not as high as the other results, a large majority reported they felt they had a better understanding than their classmates.

Table 18

Self-reported Opinions about 8th Grade Algebra

Year of Alg. I	Would you Re-take?	Would you recommend Algebra to others?	Do you have a better understanding?
1975	86.4	95.5	61.9
1976	95.5	98.5	84.6
1977	96.2	96.2	84.6
1978	96.4	96.4	85.7
1979	93.3	97.7	95.5
1980	95.4	98.5	89.6
Total	94.4	97.6	86.0

It is of interest to note that students were consistent in responding to this set of three questions. That is, if they reacted positively to the first, they were most likely to answer the second and third positively also (Table 19).

Table 19

Correlation of Re-take, Re-do, and Understanding

	Would you do it again?	Would you recommend Alg. I to others?
Do you have a better understanding?	r = .37967 p .0001 n = 229	r = .15074 p .0225 n = 229
Would you recommend Alg. I to others?	r = .27494 p .0001 n = 229	

As an interesting aside, a statistical analysis shows that there is some evidence to suggest that the longer students are away from Algebra I, the less confident they are about their having a better understanding of mathematics than their fellow students. That is, as they are involved in the study of upper level mathematics they are less likely to consider their understanding of content better than others. This analysis was done with a simple linear

regression as follows:

Dependent variable: Percent of students who indicated they have a better understanding of mathematics (y).

Independent variable: Number of years after Algebra I (x)

Model: $y = 95.957 - 4.92x$

$R^2 = .6476$

The results suggests that over 64% of the variance is accounted for by this factor.

To conclude this section and to answer Question 3, it does appear that the placement screening process has been highly effective in identifying students for Algebra I in the 8th grade.

Question 4: What is the attitude of these students with regard to mathematics and to career choices utilizing mathematics?

A measure of student attitude was not taken directly, but several sections of the survey instrument yield results which reflect student attitudes. Section II B of the instrument asked students to indicate reasons for not taking upper level mathematics. Table 9 reports that 52.9% of those responding thought they had taken all the math that was required of them. In the same table 35.2% thought their future plans would not require the study of mathematics, These results might suggest an incorrect perception of the use and application of mathematics or possibly a negative attitude toward mathematics. If these students are indeed upper level students, the expectation is that their career choices should require a more extensive study of mathematics.

Indications are that the students were generally highly motivated to take Algebra I in the 8th grade. The first question on the survey

instrument asked the students to respond to the question, "Why did you take algebra in the 8th grade?" As is shown in Table 20, the responses which might be construed as reflecting negative attitudes were not marked with great frequency. Pressure from parents and counselors was marked by a very small portion. Students were apparently seeing the early enrollment as a challenge and as an opportunity to provide better college preparation.

Table 20

Summary of Responses to
"Why Did You Take Algebra in 8th Grade?"

	Number responding yes	% of total
...to accelerate my college prep.	147	64.1
...it appeared to be a challenge	136	59.4
...it seemed better than 8th grade math	121	52.8
Only better students were eligible	57	24.9
My friends were taking it.	43	18.8
My counselor told me to.	10	4.4
My parents insisted.	6	2.6
Other	37	16.2

The student's plans for college and careers was addressed in Part III of the survey instruement. The students were asked questions regarding the extent to which they were planning to study mathematics in college. Except for students in the 1980 group, the percent of students indicating no plans to take calculus is small (Table 21). Although the interpretive value of the combined total is questionable, those percent total are amazingly large if even a part of the undecided category become "no" votes.

The expectation and hope is that more of this high ability group would choose to study college mathematics at least through calculus.

Table 21

Percent of Subjects Not Planning
to take College Calculus (or undecided)

	Undecided	No	Total
1975 n = 19	68.4	15.8	84.2
1976 n = 65	78.5	6.2	84.7
1977 n = 26	73.1	7.6	80.7
1978 n = 27	70.4	11.1	81.5
1979 n = 41	51.2	19.5	70.7
1980 n = 63	14.3	61.9	76.2

The data on post high school plans does not present anything too startling (Table 22). The vast majority do plan to attend college with a very small percent responding that they would work after high school and were not planning to attend college.

Table 22

Percent of Responses for Post High School Plans

	Undetermined	Work After High School	Work and Attend College	Attend College
1975 n = 21	4.8	0.0	47.6	47.6
1976 n = 63	22.2	3.2	36.5	44.4
1977 n = 25	20.0	0.0	40.0	40.0
1978 n = 27	18.5	0.0	40.7	40.7
1979 n = 43	37.2	7.0	25.6	30.2
1980 n = 64	29.7	1.6	21.9	46.9

Conclusions and Recommendations

The students selected have been quite successful in 8th grade Algebra as well as in subsequent math courses in which they have enrolled. The grades the students received and the student's perception of the courses both indicate high levels of student success.

The students, however, are not electing upper level mathematics courses at the rate expected. Considerable attrition has been experienced by the time Elementary Analysis, Analytic Geometry, and Calculus are to be taken. Since these courses include important foundation experiences for later study and since this appears to be at least one important reason for offering the course, students shoudl be strongly encouraged to enroll in them.

Recommendation 1: High school math teachers and counselors should be encouraged to identify and advise these students to enroll in upper level

mathematics courses. The apparent potential of this group should permit all of them to pursue careers requiring a high degree of mathematical understanding.

The placement/screening process has certainly identified students of high ability who have been successful. The matrix used for identification students appears to be more complex than is necessary.

Recommendation 2: An identification matrix using math grades from Grades 3 through 6 or 7 along with a standardized math achievement test score would appear to be as good a predictor of success in 8th grade algebra as the former matrix.

The high ability and intelligence of this group would suggest that all but a very few will be attending college and that they will be able to pursue careers requiring a good mathematical base. There is, however, a high level of indecision and/or reluctance with regard to a committment to take college level calculus and beyond.

Recommendation 3: This select group in particular, should receive frequent counseling on career choices and what those career choices mean with respect to mathematical study. It is possible that they are just not aware of the necessity of studying mathematics for a variety of vocational preparatives.

The recommendation regarding modification of the identification matrix does not include a teacher evaluation component. It would seem to be highly desirable to use teacher input in the model in some form. Since the former teacher evaluation statistically contributed little to the predictive value, the District may also want to look carefully at the form and substance of that component.

It is possible that the reluctance of students to enroll in upper level mathematics courses may in some way reflect on the content, organization, or

presentation of these courses. These issues were not addressed in this study, but the Mathematics Department may want to study these problems further with the view of strengthening the high school mathematics curriculum.

APPENDIX A

8th GRADE ALGEBRA SURVEY FOR BISD

Name_____Grade level 8 9 10 11 12 College
(Circle One)

I 8th Grade Algebra. (Mark all that are appropriate.)

A. Why did you take algebra in 8th grade?

___1. I wanted to accelerate my preparation for college.
___2. My parents insisted.
___3. It was better than taking 8th grade Math, since that would be a review only.
___4. Only the better students were eligible.
___5. My friends were taking it.
___6. It appeared to be a challenge.
___7. My counselor told me to.
___8. Other_____

B. If you could do it over again and had the choice to take 8th grade Algebra or regular 8th grade Math:

___1. I would choose 8th grade Algebra.
___2. I would wait until 9th grade, because I was not prepared for algebra in 8th grade.
___3. I would not even take algebra.
___4. Other _____

__yes __no C. Would you recommend 8th grade Algebra to an intelligent friend who will be in 8th grade soon?

__yes __no D. Do you think you have a better understanding of mathematics than fellow students who were not given the opportunity to study algebra in the 8th grade?

II. High School Mathematics

A. What math courses did you take (or do you plan to take) after 8th grade Algebra? (Mark all that are appropriate)

	If taken, mark appropriate indicator of success.			
	Very Successful	Successful	Barely Successful	Unsuccessful
___1. Algebra I				
___2. Geometry				
___3. Algebra II				
___4. Trigonometry				
___5. Elementary Analysis				
___6. Analytic Geometry				
___7. Calculus				
___8. Math of Consumer Economics				
___9. Other				

B. If you did not (or are not planning to) take mathematics all four years in High School, why not? (Mark all that are appropriate.)

_____1. Mathematics was (is) too challenging.

_____2. Mathematics was (is) too easy.

_____3. I took (plan to take) all the mathematics needed to satisfy future education requirements.

_____4. My plans for the future do not require advanced mathematics.

_____5. Parents or counselors advised me to take other subjects.

_____6. Other._____

III. Plans for college and/or a vocation.

yes	no	undecided

A. I plan to study mathematics in college at least through calculus.

B. I plan to study college mathematics beyond calculus.

C. My vocational plans include an extensive study of college mathematics.

D. My vocational plans at this time

____1. are undetermined

____2. are to begin work immediately after high school.

____3. are to work and attend college to become a_____.

____4. are to attend college to become a_____.